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ABSTRACT

Before a bilingual program can be set up, students who are potential candidates for such a program must be identified. A study was made to investigate the interrelationships of three commonly used measures of "language dominance": the Language Facility Test (LFT), the Home Bilingual Usage Estimate (HBUE), and the Teacher Judgment Questionnaire (TJQ). The population for this study included 1,799 students in grades 1-12 from three school districts in Washington State. The results indicate that the three measures do not have a high degree of interrelationship and that based on this set of data, one measure will not serve as a substitute for the others. When examined from a content analysis perspective, it is not totally surprising that the three measures are not perfectly related. Each looks at students' language usage from a somewhat different perspective. However, the fact that the results from each measure purport to indicate the "language dominance" of students implies that the results from the measures should converge. In the present study the results from the three instruments do not converge. Three possible explanations may account for the findings: (1) the study itself may be limited, given the small sample sizes and some lack of control in the administration and scoring of the instruments; (2) the instruments themselves may be faulty; (3) the problem may reside in the construct "language dominance" itself. (Author/CFM)

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THE RELATIONSHIPS AMONG THREE MEASURES OF BILINGUALISM AND THEIR RELATIONSHIP TO ACHIEVEMENT TEST SCORES

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BACKGROUND AND PURPOSE

The establishment of educational programs for the linguistically different student has become a vital concern for professional educators. Recent Supreme Court decisions such as Lau v. Nichols coupled with a new national policy on bilingual education as exemplified by the Bilingual Education Act of 1974 are moving school districts toward the establishment of bilingual/bicultural programs within their school systems. A critical step in the formative stages of any bilingual or other kind of language program is the identification of students who are potential candidates for these programs. The approach most often used to make this determination has been an assessment of students' language abilities. The Federal Government as exemplified in Title VII of the Elementary and Secondary Education Act as amended in 1974 has recognized the importance of this initial assessment. In the rules and regulations for applicants for grants, they state:

> The number of children of limited English speaking ability enrolled in the schools (must be identified) and the extent of such children's lack of competence in the English language (must be identified).[1]

Limited English speaking students are defined either as students whose native language is other than English (e.g., students not born in the United States) or students who live in homes where a language other than English is relied upon for communication. This second definition has been labelled "dominant language" in the rules. "The Task Force Findings Specifying Remedies Available for Eliminating Past Educational Practices Ruled Unlawful Under Lau v. Nichols" (hereafter referred to as "Lau Remedies") also requires a similar identification procedure.

[1] Federal Register, Friday, June 11, 1976. p. 23866.

Specifically, school districts are required to first identify students' primary or home language and then assess the degree of function or ability of the studnets so as to place the students in one of five language categories:

1. Monolingual other
2. Predominant other
3. Bilingual
4. Predominant English
5. Monolingual English[2]

While these regulations specify the outcomes that must be obtained from the initial student assessment, two major problems have been: 1) the determination of what language skills and linguistic structures to assess and 2) the identification of adequate tools or instruments to measure students' language. There is not a great deal of concensus regarding a solution to the first problem. Linguistic theoreticians have differed in their approaches to looking at student language abilities and what constitutes basic linguistic competency. Consequently, no pat answers exist as to what would be the "best" language assessment instrument. Developers of assessment devices have used this wide range of theoretical arguments to justify their particular approach to measurement. In view of these problems, the determination of what assessment tools to use is exceedingly difficult. Regardless, school districts are faced with the very real task of assessing the language abilities of their students in languages other than English. In many cases the approach that districts have chosen has been to use a variety of techniques and instruments concurrently. In fact, the "Remedies" state that multiple indices should

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[2] Task Force Findings Specifying Remedies Available for Eliminating Past Educational Practices Ruled Unlawful Under Lau v. Nichols. Office For Civil Rights, Department of Health, Education and Welfare. Summer 1975.

be used and "in the event that the language determinations conflict, an additional method must be employed by the district to make such a determination"[3] (i.e., placing the students into one of the five language categories). While the risk of misclassifying students should be reduced by using this cross-validation procedure, if a single measure of "language dominance" can be determined to be accurate by itself, costs to school districts can be greatly reduced. The major purpose of this paper is to empirically examine the rationale for using multiple measures. Specifically, the relationship between three often-used measures of relative language proficiency or "language dominance" is investigated. Additionally, where possible, the relationships between these measures and achievement test results also are investigated.

DATA SOURCES

The population for this study was comprised of 1799 students in grades 1-12 from three school districts within the same geographic area in Washington State. All the districts were responding to requests from the Office for Civil Rights for information regarding the language needs of their students. As a result, the guidlines used for the assessment were the "Remedies." All students were judged to be possibly Spanish-English bilingual on the basis of their surnames or other information available at the district level. While the total population was 1799, information was not available for all pieces of information from each student. Table 1 displays the numbers of students who were assessed using each instrument. The table indicates that the largest number of students received the Language Facility Test (1799) and the fewest number of students received a standarized achievement test (131). The instruments were administered during the period of November and December in 1975.

[3] Ibid.

Table 1

Numbers of Students in Grades 1-12 Assessed Using Each Language

	Language Facility Test	Teacher Judgment	Home Bilingual Usage Estimate	Standardized Achievement Tests
Numbers of Students	1799	846	512	131

Additionally, the same exact set of information was not gathered from each district. Table 2 displays the information collected in each district.

Table 2

Instruments Used by Each District

Districts	Language Facility Test	Teacher Judgment	Home Bilingual Usage Estimate	Standardized Achievement Tests
District 1	yes	yes	no	yes*
District 2	yes	yes	yes	no
District 3	yes	no	no	no

*Data from the achievement tests were available only for grades 1-5 and 7.

As Table 2 shows, in two districts three of the four instruments were used and in one district only one instrument was used.

PROCEDURES

In all three districts, students identified as being potentially bilingual by school district officials were administered the Language Facility Test (LFT) by trained bilingual administrators. The results were submitted by the authors for analysis. Using the algorithm developed by Zirkel,[4] the raw score results were converted into difference scores.

[4]Zirkel, Perry Alan, "A Method for Determining and Depicting Language Dominance." Paper presented at the annual convention of Teachers of English to Speakers of Other Languages. San Juan, Puerto Rico.

Based on the magnitude of the differences, students were classified into one of the five language categories identified in the "Remedies." Concurrently and independently, the Home Bilingual Usage Estimate (HBUE) and Teacher Judgment Questionnaire (TJQ), were administered to parents and teachers respectively. The HBUE was administed by trained bilingual interviewers in the families of students identified as potentially bilingual.

At the elementary school level, the TJQ was completed by teachers in self-contained classrooms. At the secondary level, the TJQ was completed by the English instructors.

The two achievement tests were administered during the regular testing program by classroom teachers.

INSTRUMENTATION

Two classes of instruments were used in this study. First, three measures of language usage were employed to determine the "language dominance" of the students. Second, two standarized achievement tests were used to determine the achievement level of these students. Both sets of instruments are described below.

Measures of Language Usage:

1. Home Bilingual Usage Estimate: This instrument, developed by R.V. Skoczylas, is designed to measure language usage in the home. It yields a single score that is used to classify students into one of five categories: 1) English monlingual, 2) English dominant, 3) apparent bilingual, 4) Spanish dominant or 5) Spanish monolingual. The categories are consistent with those specified in the "Remedies." The instrument is administered individually to parents.

2. Language Facility Test: This test, published by the Allington Corporation and developed by John Dailey, is designed to measure ability to use oral language. The test yields a measure of how well the individual is able to conceptualize and communicate in his or her chosen language. While the test was designed for use with individuals who speak English or a dialect of English, it has been used extensively in bilingual settings.
3. Teacher Judgment Questionniare: This rating scale, developed by this author, asks teachers to classify students into one of five language categories: 1) English monolingual, 2) English dominant, 3) apparent bilingual, 4) Spanish dominant or 5) Spanish monolingual. The rating scale provides the teacher with the definitions available from the "Remedies" for each category. Additionally, teachers are asked to identify the kinds of information they used to make their student placements. The information on the TJQ is included at the end of this report.

Measures of Achivement

1. Stanford Achievement Test: This instrument, developed by Richard Madden, et al., is a series of comprehensive achievement tests developed to provide measurement and assessment of learning at different levels of the educational process. Subtests in the basic battery include vocabulary, reading comprehension, mathematics (concept, computation and application), spelling and language. The subtests are described as fundamentally power

tests with ample time al owed for each section. The test is group administered. Scores were reported in these ways: national percentiles, national grade equivalents and national stanines.

2. SRA Assessment Survey: This instrument, developed by Science Research Associates, Inc., consists of curriculum-oriented batteries of achievement tests for use in grades 1 through 12. The primary level tests are power tests. All tests are group administered.

RESULTS

To investigate the relationship between the three measures of "language dominance" Kappa coefficients, both weighted and unweighted, were computed. (See Cohen, 1960 and Cohen, 1968 for a more thorough discussion of the indices). The Kappa coefficient gives the proportion of agreement between classifications after chance agreement has been excluded. The weighted Kappa coefficient can be used in instances where the categories or classifications can be ordered in such a way that one error can be said to be determined to be more serious than another. For example, in the present instance, an error made between adjacent categories can be considered less problemmatic than error between non-adjacent categories. Both Kappa and weighted Kappa theoretically can take any value from -1.00 to +1.00. If the obtained proportion of agreement between classifications is equal to the chance proportion, Kappa will have a value of zero. If there is perfect agreement between classifications, Kappa will have a value of +1.00. Table 3 displays the percent agreement to be expected by chance, the obtained agreement, the non-weighted and weighted Kappa

districts for the three pairs of relationships investigated.

Table 3

Kappa Coefficients for Grades K-12 on Three Pairs of Instruments

Instrument Pair	N	Percent Agreement		K^1	Kw^2	Km^3
		Expected by Chance	Obtained			
HBUE and TJQ	155	34.45	40.0	.046	.13	.44
LFT and TJQ	783	22.4	32.8	.18	.31	.60
LFT and HBUE	265	40.23	44.0	.01	.13	.29

[1]K = Kappa coefficient
[2]Kw = Weighted Kappa coefficient
[3]Km = Maximum value of Kappa coefficient permitted by marginal distributions

As can be seen in Table 3, the differences between the chance and obtained agreements for all three pairs of instruments are not great. This is also shown by the low Kappa values that were obtained. For all comparisons, weighted Kappa is greater than unweighted Kappa. This indicates that many of the errors made are between adjacent categories. However, the weighted Kappa's themselves are low, with the highest agreement being between the LFT and the Teacher Judgment Questionnaire (.31). Of some interest are the Km's computed for each pair. This value indicates the maximum value of Kappawhich is permitted by the marginal distributions. Low Km values mean that the marginal distributions greatly differ. For all three comparisons, the Km values are low, with the marginal relationships between the LFT and TJQ being the highest (.60). The low marginal agreements also can be observed in Table 4 which shows the numbers of students who are classified into each of the five categories by each instrument.

Table 4

Numbers of Students in Grades K-12 in Each Category As Determined by the Teacher Questionnaire, HBUE, and LFT

Instrument	N	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
HBUE	167*	3	27	33	98	6
LFT	167*	46	19	80	5	17
TJQ	167*	22	56	59	23	7

*Information from all three tests was available for 167 students.

To investigate possible grade effects in the agreement between the pairs of instruments, Kappa and weighted Kappa were computed for each grade level. For all comparisons at each grade level neither Kappa nor weighted Kappa were very large. The compariosn of LFT and TJQ classifications yielded no Kappas that were greater than .20 or weighted Kappas that were greater than .26 (Grade 3). The comparison of LFT and HBUE classifications yielded no Kappas that were greater than .14 (Grade 2). Interestingly, in this instance weighted Kappa was less than Kappa, indicating that errors were being made in non-adjacent categories. The comparison of TJQ classifications and HBUE classifications yielded no Kappas above .10 or weighted Kappas above .12 (Grade 3).

Kappa coefficients were not computed for the relationship between the three instruments concurrently. When the joint classifications of the measures were arrayed, only 9 of the 167 possible agreements were found to be in agreement.

In addition to examining the relationship between the three measures of language usage, the relationship of two of the measures, the LFT

and TJQ, and achievement test scores on the SRA Achievement Test were examined. Pearson Product-Moment correlations were computed between raw scores on the English and Spanish portions of the LFT and growth scale values on the SRA Achievement Test. Tables 5-8 display the correlation coefficients for the reading and mathematic subscales of the SRA Test and the English and Spanish scores on the LFT for grades 1 and 2, grades 1, 2 and 3, grades 3, 4, and 5 and 4, 5 respectively. Grades have been combined for analyses because of the small numbers of students within single grade levels.

Table 5

Correlations of SRA Achievement Test Results and English and Spanish LFT Scores, Grades 1-2

	Achievement Test Reading	Achievement Test Math	LFT English	LFT Spanish
Achievement Test Reading	--	--		
Achievement Test Math	.6649(43)*	--		
LFT: English	.4956(43)*	.1175(44)*	--	
LFT: Spanish	.2395(43)*	.1625(44)*	.2084(66)*	

*Numbers of Students

Table 6

Correlations of SRA Achievement Test Results and English and Spanish LFT Scores, Grades 1, 2, and 3

	Achievement Test Reading	Achievement Test Math	LFT English	LFT Spanish
Achievement Test Reading	--			
Achievement Test Math	.7385(69)*	--		
LFT: English	.4695(69)*	.2762(71)*		
LFT: Spanish	.238(69)*	.1371(71)*	.3833(101)*	

*Number of students

Table 7

Correlations of SRA Achievement Test Results and English and Spanish LFT Scores, Grades 4 and 5

	Achievement Test Reading	Achievement Test Math	LFT English	LFT Spanish
Achievement Test Reading	--			
Achievement Test Math	.7939(41)*	--		
LFT: English	.1093(43)*	.1812(42)*	--	
LFT: Spanish	.1251(43)*	.2315(42)*	.4875(57)*	--

*Number of students

Table 8

Correlations of SRA Achievement Test Results and English and Spanish LFT Scores, Grades 3, 4, and 5

	Achievement Test Reading	Achievement Test Math	LFT English	LFT Spanish
Achievement Test Reading	--			
Achievement Test Math	.7846(67)*	--		
LFT: English	.1595(69)*	.2375(69)*		
LFT: Spanish	.0337(69)*	.1071(69)*	.4883(92)*	

*Number of students

The results from Tables 5-8 indicate that the strongest relationship between any two sets of instruments is the correlation between the reading and mathematics subscales of the SRA Achievement Test with the highest correlation in grades 4 and 5 (.7939). In grades 1 and 2 and grades 1, 2 and 3 there is also a strong relationship between the English

portion of LFT and the reading portion of the SRA Achievement Test (.4956 and .4695 respectively.) This pattern does not continue for grades 4 and 5 and 3, 4, 5 where the correlations are .1093 and .1595 respectvely. For grades 4 and 5 and 3, 4, 5 there also is a strong relationship between the English and Spanish portions of the LFT (.4875 and .4883).

To further investigate the relationship between achievement results and the results of the "language dominance" tests, the numbers of students in each language category, as specified by the "Remedies," achieveing in reading above and below the 50th percentile, 40th and 25th percentile on both the SRA and SAT Achievement Tests, were identified. Table 9 displays this information for the TJQ.

Table 9

Numbers of Students Scoring Above and Below the 50th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Teacher Judgment Questionnaire, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 50	4	16	33	5	1
Percentile Above 50	2	10	28	1	0

Of interest in Table 9 is that only one student is judged to be either dominant Spanish or monolingual Spanish by teachers scored above the 50th percentile. Table 10 presents the same information for students classified by the Language Facility Test.

Table 10

Numbers of Students Scoring Above and Below the 50th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Language Facility Test, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 50	11	11	46	6	9
Percentile Above 50	5	5	36	2	3

In contrast to the results displayed in Table 9, 5 students, 2 who were determined to be dominant Spanish and 3 monolingual Spanish by the LFT, scored above the 50th percentile.

Because the majority of students scored below the 50th percentile and using the 50th percentile may be an unduly stringent criterion of success, the data also were analyzed using the 40th and 25th percentiles as the criterion levels. Table 11 displays the numbers of students above and below the 40th percentile for each teacher classification.

Table 11

Numbers of Students Scoring Above and Below the 40th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Teacher Judgment Questionnaire, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 40	2	9	28	5	1
Percentile Above 40	4	17	33	1	0

Only one student judged by teachers to be Spanish dominant scored above the 40th percentile. This same pattern also was observed when the 25th percentile was used as the criterion level. Table 12 presents the results when the 25th percentile was used as the criterion level. Generally, as the criterion level became less rigorous, the numbers of students exceeding the criterion level increased for every language category with the exception of dominant Spanish and monolingual Spanish which remained the same.

Table 12

Numbers of Students Scoring Above and Below the 25th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Teacher Judgment Questionnaire, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 25	0	3	15	5	1
Percentile Above 25	6	23	46	1	0

For the LFT, the pattern was not the same. Table 13 displays the numbers of students above and below the 40th percentile for each LFT classification.

Table 13

Numbers of Students Scoring Above and Below the 40th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Language Facility Test, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 40	5	11	33	6	9
Percentile Above 40	11	5	49	2	3

With the exception of the dominant and monolingual Spanish categories, the numbers of students exceeding the criterion levels as they became less rigorous increased. At all classification levels, the numbers of students exceeding the criterion level increased when the 25th percentile was used as the criterion. Table 14 displays this information.

Table 14

Numbers of Students Scoring Above and Below the 25th Percentile on the Reading Subtest in the Five Language Categories as Determined by the Language Facilities Test, Grade 1-5 and 7

	Monolingual English	Dominant English	Bilingual	Dominant Spanish	Monolingual Spanish
Percentile Below 25	1	6	21	2	7
Percentile Above 25	15	10	61	6	5

DISCUSSION

The purpose of this study was to investigate the interrelationships of three commonly used measures of "language dominance" to determine if a parsimonious approach to language assessment could be found. The results indicate that the three measures do not have a high degree of interrelations and that based on this set of data, one measure will not serve as a substitute for the others. When examined from a content analysis perspective, it is not totally surprising that the three measures are not perfectly related. Each looks at students' language usage from a somewhat different perspective. The HBUE looks at frequency of language used in the home; the LFT at a comparison of general language abilities; and the TJQ at the teacher's assessment of language usage. On a continum from direct to indirect assessment of language, the LFT could be

considered the most direct measure and the HBUE the most indirect. However, the fact that the results from each measure purport to indicate the "language dominance" of students implies that the results from the measures should converge. That is, if the construct "language dominance" is meaningful, multiple measures of the phenomenon should point to the same conclusions. In the present study, the results from the three instruments do not converge. Rather, the comparisons between each set of instruments and all three instruments combined are very low. Three possible explanations may account for the findings. First, the study itself may be limited given the small smaple sizes and some lack of control in the administration and scoring of the instruments. This point is discussed more fully in the "Limitations" section which follows.

Second, the instruments themselves may be faulty. The choice of instruments was based on those commonly used by school districts when they assess the languages used by their linguistically different students. In most districts some form of home language assessment is made. This assessment usually leads to two pieces of information: the identification of families where languages other than English are spoken and the classification of students into one of the five Lau categories. The process of converting the LFT scores is not unlike that used by other "language dominance" tests. Scores are obtained on both language subparts and based on the differences between scores, students are classified into one of the five language categories. The LFT, however, does differ from many other language tests in that it measures general language performance rather than specific phonological, lexical, or syntactical aspects of language.

A third possible explanation for these findings may reside in the construct "language dominance" itself. "Language dominance" is a relatively new concept in linguistics and education. In fact, it may not be unreasonabile to say that "language dominance" is a legal and political rather than a linguistic, educational or psychological construct. That is, the concept originated as the results of the Lau v. Nichols court decision and the subsequent "Remedies." As mentioned, districts have been mandated to determine the "language dominance" of their students and as a result they have turned to the linguistic, educational and psychological professions for measures. As a result of this need, within the past few years, there has been a phenomenal increase in the numbers of instruments which purport to measure "language dominance." Each looks at the question in a somewhat different way. Some look at syntax, others vocabulary, others general communicative competence, and still others look at combinations of these aspects of language. What there hasn't been is a concerted effort to first carefully define the phenomenon before instruments are devised to measure it. Throughout this paper the term "language domiance" has been written in quotation marks to reflect the ambiguity of the conept. These statements should not be interpreted as an attack against either school districts or professionals who are responding to a very real need. Rather, it is a plea for more work that needs to be done. This study also examined the relationship between LFT and TJQ and student achievement. It was hypothesized that there should be a strong positive correlation between scores on the English portion of the LFT and the reading subtest of the SRA Achievement Test. For grades 1 and 2 as well as grades 1, 2, and 3, this relationship was confirmed. In both instances

the correlations were statistically significant. However, there was not a strong relationship between these measures when grades 4 and 5 and 3, 4, and 5 were analyzed. For the earlier grades, this might mean that reading, mathematics, and oral language skills are not highly differentiated and that as students get older these skills become more distrinct. However, the fact that at all levels scores on the reading and mathematics subtests relate very strongly to one another provides conflicting evidence. The strong relationships between the SRA subtests in part, may be a function of the metrics used in the test. While the correlations provide useful descriptive information about the LFT and its relationship to achievement, to determine how the results from the LFT and TJQ compared, the categories generated by each measure were compared to three achievement level criterion levels. It was hypothesized that one characteristic of a student who was dominant or monolingual in a language other than English should be low achievement (This, in fact, is an assumption in the "Remedies."). The results indicate that the results form the teacher classifications were consistent with this hypothesis. Only one student who scored above the 50th percentile was placed in either the Spanish dominant or Spanish monolingual categories. No additional students in these two categories scored above the 40th and 25th percentile criterion levels. The results from the LFT were not consistent with this hypothesis. As the criterion level was reduced, the numbers of Spanish monolingual and Spanish dominant students achieving above the criterion level increased.

LIMITATIONS OF THE STUDY

This study was an attempt to investigate issues that have practical importance in a naturalistic setting. The authors had limited control over many aspects of data collection and sources of information. As a result, many unknown sources of error may have resulted. Additionally, the fact that the same common set of data were not available from each district resulted in smaller sample sizes and possible non-comparability of data across sites. While this last point is ameliorated by the geographical proximity and demographic similarities among the districts, the possibility of important differences cannot be ruled out. Wherever possible the largest numbers of data were used for analyses. When contrasts between multiple instruments were made for comparative purposes, only data from subjects who had responded to all instruments were considered.

The algorithm used to convert LFT scores to domiance categories also may have limitations. Work now is being conducted to convert the low scores to dominance levels based on threshold levels of competence rather than absolute differences between scores. Finally, the fact that only data from three districts within a small geographic area were analyzed limits the generalizations that can be made from this study.

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INFORMATION SOURCES USED BY TEACHERS TO CLASSIFY STUDENTS

	Source	Responses
1.	Student's language performance in the classroom.	108
2.	Biographical information about the student.	51
3.	Information from the school counselor regarding his/her perceptions of the language used by the student.	33
4.	Information from other teachers regarding their perceptions of the language used by the student.	56
5.	Information from parents and other family members regarding the languages used by their children.	46
6.	Information from peers regarding the languages used by the student.	58
7.	Information from community members regarding the languages used by the student.	11
8.	Scores on standardized tests.	26
9.	Personal observations of the languages used by the student when outside your class.	84
10.	Other Asked students--9 Spanish instructional materials--2 Bilingual aide--3 Home visit--1 Testing--2	24